WHAT IS CLAIMED IS:

1. A method of controlling an input voltage of a high frequency amplifier, the method comprising:

measuring power supplied to a load;

determining a first control variable for a series element disposed upstream from the high frequency amplifier based on the measured power and a given set point; and

determining a second control variable for a switched DC supply unit from a voltage drop across the series element such that the voltage drop does not exceed a given maximum value and does not fall below a given minimum value.

2. The method of claim 1, wherein the power supplied to the load is determining by measuring a portion of the power supplied to the load.

3. The method of claim 1, wherein the power supplied to the load is determining by measuring a portion of the power reflected from the load.

4. The method of claim 1, wherein the control rate for controlling the series element is less than the control rate for controlling the DC supply unit.

5. The method of claim 4, wherein the control rate is less than 10 ms.

6. The method of claim 1, further comprising determining a third control variable for the series element from a voltage present at a switching element of the high frequency amplifier and a set point for the maximum allowable voltage that can be present at a switching element of the high frequency amplifier.

7. The method of claim 1, further comprising determining a fourth control variable for the series element from a power measured at an output of the high frequency amplifier and a given power set point.

8. The method of claim 1, further comprising determining a fifth control variable from a current measured at an output of the series element and a given internal set point for a maximum current.

9. The method of claim 6, further comprising:

determining a fourth control variable for the series element from the power measured at an output of the high frequency amplifier and a given power set point; and

determining a fifth control variable from a current measured at an output of the series element and a given internal set point for a maximum current.

10. The method of claim 9, wherein only the control variable causing a strongest control is transferred to the series element.

11. The method of claim 9, wherein the control rate for the first, third, fourth, and fifth control variables is faster than 10 ms.

12. The method of claim 9, wherein the control rate for the first, third, fourth, and fifth control variables is faster than 100 microseconds.

13. The method of claim 9, wherein the control rate for the first, third, fourth, and fifth control variables is between about 10 microseconds and 1 millisecond.

14. The method of claim 1, wherein the series element and an oscillator connected to the high frequency amplifier are switched on and off synchronously.

15. The method of claim 14, wherein at least one control stage is switched on and off synchronously with the series element.

16. A control arrangement for controlling an input voltage of a high frequency amplifier, comprising:

a series element disposed upstream from the high frequency amplifier;

a first control stage for determining a first control variable from a power supplied to a

load and a set point; and

a switched DC current supply unit with an allocated second control stage, for determining a second control variable from a voltage drop across the series element.

17. The control arrangement of claim 16, wherein the series element comprises at least one semiconductor element.

18. The control arrangement of claim 17, wherein the semiconductor element is a transistor.

19. The control arrangement of claim 16, further comprising a third control stage connected to the series element for determining a third control variable, wherein the third control stage is supplied with voltage present at a switching element of the HF amplifier.

20. The control arrangement of claim 16, further comprising a fourth control stage connected to the series element for determining a fourth control variable, wherein the fourth control stage is supplied with a power measured at an output of the HF amplifier.

21. The control arrangement of claim 16, further comprising a fifth control stage connected to the series element for determining a fifth control variable from the current measured at an output of the series element and a given maximum set point for the current.

22. The control arrangement of claim 16, further comprising:

a third control stage connected to the series element for determining a third control variable, wherein the third control stage is supplied with a voltage present at a switching element of the HF amplifier;

a fourth control stage connected to the series element for determining a fourth control variable, wherein the fourth control stage is supplied with a power measured at the output of the HF amplifier; and

a fifth control stage connected to the series element for determining a fifth control variable from a current measured at the output of the series element and a given maximum set point for the current.

23. The control arrangement of claim 22, further comprising a switch for selecting the control variable to be transferred to the series element.

24. The control arrangement of claim 16, further comprising a command unit connected to an oscillator for driving the HF amplifier and to the series element or to a switching element connected to the series element.

25. The control arrangement of claim 24, wherein the command unit is a pulse generator.

26. The control arrangement of claim 24, wherein the command unit is connected to at least one control stage.